

IN MEMORIAM Neil F. Bourne 1929–2018

Neil Bourne, a driving force in the development of shellfish aquaculture in Canada, the United States, and internationally, died on July 21, 2018, in Nanaimo, British Columbia, Canada. Neil's sphere of influence was considerable, and his lasting contributions are many. His research in the fields of molluscan natural populations and bivalve aquaculture inspired many to pursue a career in aquaculture. He gave freely of his time to colleagues and students and supported many developing careers in the shellfish industry. He was vocal in advocating for the value of aquaculture and was always open to discussing the latest industry issues and innovative solutions while retaining his own perspective on how the industry should develop.

Born on August 11, 1929, in London, Ontario, Canada, Neil's father nurtured an early interest in biology, particularly bird watching, which remained a life-long passion. By the time he moved to Hamilton, Ontario, in 1939, he had over 150 species on his bird list. Neil received a B.Sc. and M.Sc. from McMaster University in Canada and spent a year in Germany studying limnology at the Freshwater Institute in Pleon and marine biology at the University of Kiel. He returned to Canada and was awarded his Ph.D. from the University of Toronto in 1959.

He joined the Fisheries Research Board of Canada on graduation and worked out of the St. Andrews Biological Station in New Brunswick under the late Dr. J. C. Medcof, also an Honored Life Member (HLM) of the National Shellfisheries Association (NSA). He led investigations supporting the rapidly developing sea scallop fishery that included basic biology and ecology, population dynamics, fishing gear efficiency, and exploratory work to locate sea scallop resources in other areas of the Canadian Atlantic coast. He was also introduced at this time to bivalve breeding by the late Dr. Victor Loossanoff (HLM) and spent time at his laboratory in Milford Connecticut. This began a life-long interest and later a commitment to shellfish aquaculture.

In 1965, Neil and his young family moved to the west coast of Canada to work at the Pacific Biological Station in Nanaimo, British Columbia. Initially he worked under the late Dr. Dan Quayle (HLM), and studied the natural populations of clams, assessing production for commercial harvest. At the time, only butter clams were harvested commercially in British Columbia. His work covered a wide range of molluscan research including basic biology of several Pacific Coast species, population studies of commercially important clams, harvesting gear efficiency, and culture techniques. He became involved with the British Columbia oyster industry and researched the processes and environmental requirements of the natural breeding populations that supplied much of the industry with seed at the time. He developed methods to predict Pacific oyster spatfall that was an essential planning tool for the industry. He undertook extensive surveys to determine the dispersal of Manila clams northward along the coast and, as a result of these studies, a fishery became established on the central coast of British Columbia.

As he became increasingly convinced that bivalve aquaculture could fill the gap caused by the natural limitations of wild shellfish production, his research included the study of both fisheries management and culture techniques, initially for butter and littleneck clams and abalone, and later the Manila clam and Japanese scallop. His research on Manila clams and Japanese scallops was instrumental in establishing the culture industries for these species that exist today. In the early 1970s, he partnered with Dr. Ken Chew (HLM) of the University of Washington, and for many years they worked collaboratively on improving culture techniques for Manila clam farming both in the United States and Canada.

From 1981 to 1991 he led a program to investigate the feasibility of scallop culture in British Columbia. Several species were initially investigated, but the decision was made to work with the Japanese scallop. Methods were developed to produce juveniles in a hatchery and rear them to commercial size within two years, and much of the information was published in *A Manual for*

911

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Scallop Culture in British Columbia. Neil felt it was a highlight of his career that his research was used to build a large commercial hatchery which started a scallop culture industry in British Columbia that continues to this day.

In 1999, Dr. Shawn Robinson, Fisheries and Oceans Canada, a long-time friend and colleague, recorded Neil's own recounting of his career in fisheries and aquaculture and his drive to develop shellfish aquaculture. In this interview, Neil states that his interest in aquaculture was stimulated by the belief that the only way open to increasing shellfish yields was through culture. The full transcript of this interesting interview can be found at www.shellfish.org.

Neil was active nationally and internationally, assisting universities and several scientific societies. He took a secondment in the mid-1970s to the Canadian International Development Agency, serving as the director of a fisheries training program at the University of the South Pacific in Suva, Fiji. He was the Canadian government representative for a project to assess the Cuban oyster industry and to determine if a joint Cuba–Canada research and development aid program on oysters could be established. He also led the Food and Agriculture Organization project to improve oyster production and processing in Qinzhou Prefecture, China. Until recently, he served as a volunteer advisor for the Canadian Executive Service Organization.

Neil held the position of Affiliate Professor at the School of Fisheries, University of Washington, and served on the committees of more than 20 graduate students, many at the University of Washington and also at the University of British Columbia, University of Victoria, and Simon Fraser University in British Columbia.

Neil felt information and data were to be provided to those who could put it to best use and to those who could build on his work. He authored more than 150 publications from 1960 through 2016 on shellfish stock assessment and management and bivalve aquaculture. These articles provide a wealth of information and many remain in use today, such as *A Manual for Scallop Culture in British Columbia* and *Hatchery Culture of Bivalves*.

Neil served on many executive boards including the Canadian Society of Zoologists where he was Treasurer from 1972 to 1980, the World Aquaculture Society from 1984 to 1986, and the Aquatic Resources Subcommittee of the Science Council of British Columbia from 1982 to 2002. He was involved in the early development of the Aquaculture Association of Canada, serving on the board from 1984 to 1988 and as President from 1986 to 1987. He joined the NSA in 1961 and was active in the society until his passing, serving on the Executive Committee from 1974 to 1983, and as the first Canadian President of the NSA from 1981 to 1982. He was a member of the editorial board of the *Journal of Shellfish Research* for many years, and routinely assisted authors whose first language was not English to prepare their manuscripts for publication.

Neil's work to further our knowledge of shellfish, and his dedication both to bivalve aquaculture and to those who worked in the industry brought him many accolades and awards. His exemplary service to the NSA and the profession was recognized in 1990 when he was made an HLM-an award that recognizes a highly respected scientist who has made substantial scientific contributions to knowledge and utilization of shellfish. In 1991, he received the David H. Wallace Award given to individuals whose activities in shellfisheries, aquaculture, and conservation have promoted understanding, knowledge, and cooperation among industry members, the academic community, and the government. In 1993, he received an Award of Merit from the Canada Department of Fisheries and Oceans for exceptional and distinguished contributions to the effectiveness and efficiency of the Public Service and the Department, particularly for contributions to the aquaculture industry of British Columbia. In 2000, Neil was the first recipient of the Lifetime Achievement Award from the Aquaculture Association of Canada for his long-time service to the Association, the research community, industry, and young scientists as exemplary examples of the goals of that organization. In October 2004, the newly constructed Center for Shellfish Research at Vancouver Island University, Nanaimo, British Columbia, Canada, was dedicated to two men who tirelessly supported industry development and whose contributions to shellfish biology and culture were of the utmost importance-Dr. Dan Quayle (HLM) and Dr. Neil Bourne. In 2015, the NSA initiated an award to recognize outstanding contributions to education, outreach, extension, aquaculture, or shellfisheries. The NSA recognized two individuals whose career has exemplified the substance of the award and named it the Neil Bourne-Kenneth K. Chew Award. To mark the occasion, Neil and his friend and colleague, Dr. Ken Chew, were recorded discussing the highlights and various exploits of their careers in shellfish. The entertaining video was presented at the inaugural award ceremony and is available for viewing at www.shellfish.org.

After 35 years of public service, Neil retired in 1994, embarking on a second career as Emeritus Research Scientist, providing mentorship and support on a regular basis and continuing to publish. He was going to his office at the Pacific Biological Station regularly and reviewing manuscripts until a few months before his passing.

Neil had many interests and activities outside of shellfish. He and his wife Jean raised a family on both coasts of Canada. During his early career in St. Andrews, he became a dedicated golfer. He continued golfing after moving to British Columbia and also volunteered for many years with the Boy Scouts of Canada and the Nanaimo Home Makers Society. An avid birdwatcher from a very young age, he and Jean traveled the globe with a pair of binoculars in his early retirement years. He was proud to have taken his bird watching to all continents of the globe.

Neil was an inspiration to many. His wry sense of humor and depth of knowledge will be missed. The last word goes to Neil—the following is an excerpt from a presentation in 2013.

I have had a wonderful career in the field of aquaculture and I thank all of the people who have assisted me with my work. There were a lot of funny and happy occasions during my career and some rather bleak moments, but these passed and we continued on and eventually were successful. I have been associated with many excellent people and also met many other wonderful people.... I wish all of those people who follow much success with their careers.

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IN MEMORIAM: NEIL F. BOURNE

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